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ABSTRACT

A study was conducted to determine the effectiveness of the PLAN teacher training program in changing teacher classroom behavior. The program, to train teachers in skills specific to the use of the PLAN system of individualized education, included a 2-day spring 1969 session, a 3-day summer conference, a fall minicourse, and inservice consultant training. Subjects were 24 PLAN and 12 Control teachers in Eastern districts and 36 PLAN and 14 Control teachers in Western districts. Using the PLAN Teacher Observation Scale (TOS), trained observers collected data on 21 categories of teacher behavior totalling one hour observation for each teacher in fall 1969 and in spring 1970. It was hypothesized first that PLAN teacher at the primary, intermediate, and secondary levels and all levels combined will spend more time than Control teachers in a) diagnostic and didactic inquiry, b) decision facilitation, c) leading small group discussion, d) tutoring in a small group, and e) giving positive verbal or nonverbal messages, and second that Control teachers at the same levels will spend more time than PLAN teachers a) providing content in small or large group discussion, b) giving negative verbal or non-verbal messages, c) managing records, d) managing learning materials and equipment, and e) interacting with a large group of students. Hypothesis 1 was partially supported in a, b, c, and d. Hypothesis 2 was supported in a and e and partially supported in b. (See also SP 004 464, ED 037 413, ED 037 414, and ED 034 729.) (JS)

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TEACHER BEHAVIOR

IN PLAN AND CONTROL CLASSROOMS

USING THE PLAN TEACHER OBSERVATION SCALE

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The PLAN teacher training program (Steen, 1969) is designed to change the behavior of the teacher in the PLAN classroom. A Title III ESEA grant (Shanner, et al., 1967) provided the means for developing the program and determining its effectiveness in changing teacher classroom behavior. To measure the change, the PLAN Teacher Observation Scale (TOS) was developed (Quirk, 1969).

The original scale was developed under the Title III project and was used in western PLAN and Control classrooms in May, 1969. The scales were then revised by Westinghouse Learning Corporation and used in the fall of 1969 and spring of 1970 in eastern and western developmental PLAN and Control classrooms. The data collection in the eastern schools was supported by an Educational Professional Development Act (EPDA) grant. This paper discusses the comparison of fall and spring data for all PLAN and Control classrooms and for eastern and western PLAN classrooms.

Description of the Teacher Training Program

The purpose of the PLAN Teacher Training Program is to provide training for the teachers in skills specific to the use of the PLAN system of individualized education. These skills have been categorized into managerial, organizational, counseling, and tutoring techniques, and they are skills that are assumed to make it possible for teachers to operate most effectively in that particular individualized approach to education called PLAN. Effective teaching is here defined as that which facilitates improvement in student behavior. Improvement in student behavior, in turn, is measured by the extent to which students are able

to achieve their unique academic goals and improve in the development of their ability to plan and to manage their own behavior.

Three major guidelines were followed in designing the teacher training program: 1) The instructional setting for teachers should simulate the setting for students so that teachers have an opportunity to experience the type and sequence of activities which they will in turn be teaching students to use. 2) The pre-service training activities should be spaced over a four month period. 3) The training program would consist of pre-service emphasis on management and organization and in-service emphasis on tutoring and counseling skills. The resulting program included spring, 1969, training; summer, 1969, training; fall, 1969, training; and in-service consultant activities during the 1969-70 school year.

Spring Training, 1969

During the two days of spring training teachers visited and observed actual PLAN classes in operation: The teachers were given observation forms to use during their classroom visits and discussions were held at the end of each day to highlight particular points. Each teacher visited three separate classroom settings to observe student activities, teacher activities, and the overall organization of the classroom.

A third day consisted of an all-day individualized session on classroom organization. A module was written with instructional objectives and related activities for achieving the objectives. Each teacher completed the objectives and the performance test for the objectives. Performance test cards were transmitted through the local school terminal

to the computer in Iowa City where they were scored. At a later date each teacher met individually with his PLAN consultant to discuss the teacher's performance on the Materials Organization test.

Summer Training, 1969

A three-day conference was held with materials on the PLAN Curriculum, the First Five Days of School, the Computer, Individualizing the Student's Program and a review session on the Materials Organization. Teachers new to PLAN were required to attend all three days and to complete all the training activities. Each teacher had to predetermine the time he would participate in a group activity or attend a consultant presentation. The rest of the time was scheduled by each teacher independently.

Teachers returning to PLAN attended the conference for one day only and studied materials individually prescribed by their consultant. For most returning teachers this included the material on the classroom use of the Computer and either Materials Organization or Individualizing the student's POS.

Classrooms were arranged so that teachers could work in an individualized setting. The PLAN consultants modeled the teacher's role, conducted small group discussions, tutored individuals and served as resource personnel for the teachers in training.

Fall Training, 1969

Fall training included the Far West Laboratory Minicourse on Tutoring. All teachers at the intermediate level in the east and twenty teachers in the west participated in the use of videotapes; seventeen teachers received written material on tutoring. The written material

included the same content as the videotapes from the minicourse. The fall training began in October and continued through November. Teachers chosen to participate in the minicourse all began training at the same time. The consultant worked with the teachers only to set up the course. The course itself was self-administered.

Teachers receiving only the written material were presented the module on tutoring on an individualized basis. The consultant determined the appropriate time and arranged for a tutoring session with the teacher. There were no written tests for the tutoring module.

In-service Consultant Training, 1969-70

Each instructional objective in the teacher training program has an accompanying performance criterion which designates the desired teacher behavior in the classroom relative to each of the objectives. An example would be:

Materials Organization and Room Arrangement

OBJECTIVE

1. The teacher is able to catalogue learning material to meet the criteria presented in the Materials Organization Guide.

PERFORMANCE CRITERION

1. The student is able to locate and return TLU related material with ease.
   a. Primary: all materials are catalogued so as to meet the criteria presented in the Materials Organization Guide.
   b. Intermediate/Secondary: (see above)

   (Five students are randomly selected. Using a TLU and a checklist a consultant notes these five students easily locate and return material and equipment.)

The performance criterion provides the basis of the in-service consultant help. Consultants work with teachers to ensure the transfer of the instructional objectives of the teacher training program to the classroom setting. While the instructional objective is usually achieved during the conference period, the performance criterion is not achieved until the teacher is in his own classroom. The performance criterion provides a guide for the consultant in planning his consulting activities with each teacher. A teacher who had completed the instructional objective stated above would not have completed the training in classroom organization until the performance criterion was also achieved. Every school was visited once a week and each teacher received individualized consulting help depending upon his achievement of the training objectives.

Differences in the Eastern and Western Teacher Training Programs

The training conference for the western teachers was held at one location. All districts sent their participating teachers to the same conference. This made it possible for four members of the western PLAN consulting staff to be present during the entire three day conference. In the east, simultaneous conferences were held in four different locations. No more than two consultants could be available at any conference at any time.

The consulting staff for the eastern schools resigned in January 1970 and were not replaced. Local PLAN teachers were assigned to coordinate activities in each eastern district for the remaining half of the school year.

Another difference occurred in the order in which material was presented. The Room Arrangement and Materials Organization material was presented in the spring in the west and in the summer in the east. For this reason eastern spring conferences were two days instead of three.

Data Collection

All of the data reported were collected by trained observers who observed the teachers in their ongoing classrooms. For a discussion of observer selection and training see the companion paper by Lipe and Steen (1970). The teacher observer tallied the behavior of the teacher into twenty-one predefined categories. Table 1 presents the categories.

Table 1

Categories of the PLAN Teacher Observation Scale (PLAN-TOS)

(Revised August, 1969)

I. Individual Instruction	
1. Diagnostic and didactic inquiry	(1)
2. Decision facilitating	(2)
3. Solution giving	(3)
4. Extending concepts and interests	(4)
5. Silent attending	(5)
II. Small Group Interaction	
1. Modeling the discussion leader role	(6)
2. Leading group discussion	(7)
3. Tutoring (discussion)	(8)
4. Providing content (lecturing)	(9)
5. Silent attending	(10)
III. Large Group Interaction	
1. Leading group discussion	(11)
2. Tutoring (discussion)	(12)
3. Providing content (lecturing)	(13)
4. Silent attending	(14)
IV. Behavior Modification	
1. Giving positive verbal or non-verbal message	(15)
2. Giving negative verbal or non-verbal message	(16)
V. Systems Management	
1. Managing computer materials and records	(17)
2. Managing learning materials and equipment	(18)
3. Managing student activities	(19)
4. Observing, listening, or walking	(20)
VI. Other	
1. Activities unrelated to instruction	(21)

Appendix 1 presents the operational definitions of Teacher Behavior Categories.

Data for all classrooms were gathered during October and November, 1969, and again in late April and May, 1970. All teachers were observed for three separate 20 minute observational periods for a total of one hour's observation for each teacher. The distribution of PLAN and Control teachers is illustrated in Table 2.

Table 2

Distribution of PLAN and Control Classrooms

	Eastern Districts				Western Districts				
PLAN Classrooms	Primary	Intermediate	Secondary	Sub Total	Primary	Intermediate	Secondary	Sub Total	Grand Total
Number of Classrooms in Districts Observed	25	38	61	124	36	39	21	96	220
Number Observed for One Hour in Fall	25	37	49	111	36	39	16	91	202
Number Observed for One Hour in Spring	23	32	48	103	35	39	14	88	191
Control Classrooms									
Number of Classrooms Selected in Districts Observed	12	15	21	48	15	14	12	41	89
Number Observed for One Hour in Fall	12	15	18	45	14	14	8	36	81
Number Observed for One Hour in Spring	12	15	16	43	14	14	5	33	76

HYPOTHESES AND SUPPORTING RATIONALE

Hypotheses Regarding Teacher Behavior

Hypothesis 1: PLAN teachers at the primary, intermediate, and secondary levels and all levels combined will spend more time than Control teachers in diagnostic and didactic inquiry (category 1), decision facilitating (category 2), leading small group discussion (category 7), tutoring in a small group (category 8), and giving positive verbal or nonverbal messages (category 15).

During the summer training conference, all teachers new to PLAN completed a module on Individualizing the Student's Educational Program. This module emphasized an approach to counseling students which would facilitate student participation in decisions about his program of studies, his behavior in the PLAN setting and his long-range goals. The use of positive reinforcement as a behavior modification technique was emphasized throughout the material. The module and related activities could be completed in six to eight hours. All teachers at all levels completed the module.

In October and November, 1969, PLAN teachers participated either in the Far West Laboratory Minicourse on Tutoring or in a module on Tutoring. The emphasis was on the tutoring process which included a method of diagnosis, prescription and reinforcement. Emphasis was placed on small group tutoring as well as individual tutoring. All teachers at all levels received this material, either on tape or in written form. Since there

was a change in field consultant personnel and since these materials were not monitored by the computer, it is impossible to know the exact number who completed them.

Hypothesis 2: Control teachers at the primary, intermediate, and secondary levels and at all levels combined will spend more time than PLAN teachers providing content in small or large group discussion (categories 9 and 13), giving negative verbal or non-verbal messages (category 16), managing records (category 17), managing learning materials and equipment (category 18), and interacting with a large group of students (categories 11 + 12 + 13 + 14).

PLAN teachers receive specific instruction concerning the use of the PLAN system to account for the necessary management activities in the classroom. This material is covered in spring training and takes a minimum of one day to complete. All teachers at all levels completed this material.

Providing content and giving negative verbal and non-verbal messages are in contradiction to the training that the teachers receive in the Tutoring material, the Curriculum module and the module on Individualizing the Educational Program. The Tutoring module emphasizes requiring the student to find solutions as opposed to the teacher offering solutions. The same process is involved in providing content as discussed in the Curriculum module. These training materials emphasize the shift of responsibility from teacher to student in both curriculum content and solution giving. Over time, solution giving in individual instruction would also be reduced as students learn to find their own solutions to

learning problems. Many students need to use the teacher as a resource person who must give solutions to immediate problems so that students can continue their learning activities. All teachers new to PLAN completed the Curriculum module. The time required was about four hours.

The training material on Individualizing the Student's Educational Program emphasized the advantages of positive reinforcement in opposition to punishment as a means of behavior modification. This approach is emphasized across all training materials.

The design of the PLAN system obviates the necessity for large group instruction. Instead, PLAN teachers may interact with small groups of students who are designated as groups according to the students' common needs and objectives. Only those students working on the same objective at any particular point in time would be organized into a group. Due to the variety in the distribution of modules across students and the variation of rates at which students would progress through the modules, it is not likely that a group of students working on the same objective at the same time would include more than five students at a time.

Tests of Hypotheses

The data on individual PLAN classrooms were grouped as follows: primary level (grades 1, 2, and 3), intermediate (grades 5, 6, and 7), and secondary (grades 9, 10, and 11). All western PLAN classes were grouped for comparison with western Control classes, and all eastern PLAN classes were grouped for comparison with eastern Control classes.

The category frequencies of all classrooms in each group were combined and then converted to percent. Tables 3 and 4 report the percent

of time spent in each category of behavior and in the combined categories for the western developmental classrooms. Tables 5 and 6 report the same data for the eastern developmental classrooms. Tables 7 and 8 report the differences in fall and spring percents for east and west. The Mann-Whitney U test (Siegel, 1956) was then applied only to those categories relevant to the four hypotheses; those U values are reported in the tables.

Table 3

Teacher Observation Scale: Western Developmental Classrooms

Fall, 1969

Category	Teacher Observation Scale											
	Primary			Intermediate			Secondary			All Levels Combined		
	PLAN N=35	Control N=14	Mann Whitney	PLAN N=39	Control N=14	Mann Whitney	PLAN N=14	Control N=5	Mann Whitney	PLAN N=88	Control N=33	Mann Whitney
	Percent	Percent	U	Percent	Percent	U	Percent	Percent	U	Percent	Percent	U
Individual Instruction												
1. Diag. & didac. inq.	8.9	3.7	95**	9.8	5.6	149 *	10.1	2.7	9 *	9.5	4.4	629 **
2. Decision facilitat.	.2	0.0	154 *	.5	.6	242.5	.6	0.0	12.5*	.4	.2	1019 *
3. Solution giving	19.1	5.3		20.4	11.4		22.9	3.0		20.3	7.5	
4. Ext. conc. & int.	.2	0.0		.3	0.0		.9	0.0		.4	0.0	
5. Silent attending	12.4	4.1		13.0	5.9		12.4	2.0		12.7	4.6	
Small Group Discussion												
6. Mod. discus. lead.	.4	.1		.02	.01		0.0	0.0		.2	.03	
7. Lead. group discus.	1.8	3.3	215	1.8	1.0	254	1.5	.3	32.5	1.7	1.9	1446.5
8. Tutoring	3.9	4.9	234.5	4.1	4.9	262.5	1.3	.1	30.5	3.6	4.2	1411.5
9. Providing content	1.7	.5	178.5	.9	1.1	251	1.0	0.0	32.5	1.3	.7	1308
10. Silent attending	3.1	8.9		3.5	4.0		2.2	.1		3.1	5.5	
Large Group Discussion												
11. Lead. group discus.	.7	9.4		.2	6.2		.2	8.4		.4	7.9	
12. Tutoring	1.0	10.4		.7	10.0		.1	24.0		.7	12.3	
13. Providing content	.6	2.9	171	.9	4.5	111.5**	.3	21.5	0**	.7	6.4	670.5**
14. Silent attending	1.0	10.9		.9	11.2		.1	22.7		.8	12.8	
Behavior Modification												
15. Positive message	1.3	1.0	207	.5	.6	253.5	.2	.1	21.5	.8	.7	1451.5
16. Negative message	1.6	1.3	202.5	1.2	1.0	261	.7	.4	28	1.3	1.0	1297.5
Systems Management												
17. Man. comp. mat.	1.7	.1	98.5**	3.8	1.1	113.5**	3.7	1.1	12*	3.0	.7	593**
18. Man. learn. mat.	10.6	5.7	112**	9.2	8.0	246	9.6	3.6	8*	9.9	6.4	871.5**
19. Man. stud. act.	15.2	12.3		11.0	9.4		12.9	2.2		13.0	9.5	
20. Obs., list., walk.	13.5	14.0		14.9	13.0		16.4	7.0		14.6	12.5	
Other												
21. Act. unrel. to inst.	1.1	1.3		2.5	.7		3.0	.8		2.0	.9	
Individual (1+2+3+4+5)	40.8	13.1		44.0	23.5		46.9	7.6		43.2	16.7	
Small Group (6+7+8+9+10)	10.9	17.7		10.2	11.0		5.9	.4		9.8	12.3	
Large Group (11+12+13+14)	3.3	33.5	19**	2.7	31.8	62**	.7	76.6	0**	2.6	39.3	189**
Behavior Modif. (15+16)	2.9	2.3		1.7	1.7		.9	.5		2.0	1.7	
Systems Management (17+18+19+20)	41.0	32.2		39.0	31.4		42.6	14.0		40.3	29.1	

*p < .05
**p < .01

Table 4

Teacher Observation Scale: Western Developmental Classrooms

Spring, 1970

Category	Teacher Observation Scale											
	Primary			Intermediate			Secondary			All Levels Combined		
	PLAN N=35	Control N=14	Mann Whitney	PLAN N=39	Control N=14	Mann Whitney	PLAN N=14	Control N=5	Mann Whitney	PLAN N=88	Control N=33	Mann Whitney
	Percent	Percent	U	Percent	Percent	U	Percent	Percent	U	Percent	Percent	U
Individual Instruction												
1. Diag. & didac. inq.	18.8	4.4	30 **	14.8	7.8	115.5**	11.2	2.0	2.0**	15.8	5.5	349.5**
2. Decision facilitat.	.3	0.0	168	1.2	.3	163.5*	.8	0.0	22.5	.8	.1	965**
3. Solution giving	18.7	5.6		21.0	12.8		20.6	6.6		20.0	8.8	
4. Ext. conc. & int.	.1	0.03		.2	.1		.2	.03		.1	.1	
5. Silent attending	10.8	3.5		9.4	4.4		11.5	1.5		10.5	3.6	
Small Group Discussion												
6. Mod. discus. lead.	0.0	.1		0.0	0.0		0.0	0.0		0.0	.04	
7. Lead. group discus.	.9	1.2	229	.2	.4	248	.5	.2	30	.5	.7	1442
8. Tutoring	3.6	3.2	216.5	2.2	1.4	231.5	2.4	.4	27	2.8	2.0	1241
9. Providing content	1.7	2.6	220	1.4	1.8	265	2.2	0.0	27.5	1.6	1.8	1450
10. Silent attending	3.3	6.1		1.2	1.7		1.8	.1		2.2	3.3	
Large Group Discussion												
11. Lead. group discus.	.2	2.6		.2	2.6		0.0	1.2		.2	2.4	
12. Tutoring	.2	13.1		1.8	6.0		.1	28.8		.9	12.4	
13. Providing content	.3	11.1	76 **	.6	5.8	140.5**	.4	24.7	00**	.5	10.9	492.5**
14. Silent attending	.4	14.4		1.3	9.9		.1	22.5		.7	13.7	
Behavior Modification												
15. Positive message	1.6	.8	115*	.8	.4	179	.1	.1	33.5	1.0	.6	1026*
16. Negative message	.6	.7	213.5	.3	.3	263.5	.2	.3	26	.4	.5	1272
Systems Management												
17. Man. comp. mat.	2.0	.3	101.5**	2.9	3.3	265	4.9	1.8	11*	2.9	1.8	921**
18. Man. learn. mat.	7.6	.6	176	9.3	10.2	267.5	13.3	3.2	6*	9.3	7.2	1088*
19. Man. stud. act.	10.6	7.3		10.2	10.6		7.3	1.7		9.9	7.9	
20. Obs., list., walk.	16.5	16.4		17.4	16.8		17.4	4.9		17.0	14.9	
Other												
21. Act. unrel. to inst.	1.9	1.1		3.1	3.5		5.0	0.0		2.9	2.0	
Individual (1+2+3+4+5)	48.7	13.5		47.0	25.3		44.3	10.1		47.2	18.0	
Small Group (6+7+8+9+10)	9.5	13.0		5.1	5.3		6.9	.6		7.1	7.9	
Large Group (11+12+13+14)	1.1	41.2	28**	3.9	24.3	81**	.6	77.3	00**	2.3	39.5	238**
Behavior Modif. (15+16)	2.2	1.5		1.1	.7		.4	.4		1.4	1.0	
Systems Management (17+18+19+20)	36.7	29.6		39.8	40.9		42.9	11.6		39.0	31.7	

*p < .05
**p < .01

Table 5

Teacher Observation Scale: Eastern Developmental Classrooms

Fall, 1969

Category	Teacher Observation Scale											
	Primary			Intermediate			Secondary			All Levels Combined		
	PLAN N=23	Control N=12	Mann Whitney	PLAN N=32	Control N=15	Mann Whitney	PLAN N=48	Control N=16	Mann Whitney	PLAN N=103	Control N=43	Mann Whitney
	Percent	Percent	U	Percent	Percent	U	Percent	Percent	U	Percent	Percent	U
Individual Instruction												
1. Diag. & didac. inq.	10.9	4.8	45.5**	9.1	2.6	68**	9.4	3.9	163**	9.6	3.7	830.5**
2. Decision facilitat.	1.7	1.0	81*	2.5	.3	116.5**	2.0	.4	197**	2.1	.5	1177**
3. Solution giving	10.1	5.8		9.3	2.1		11.7	3.8		10.6	3.8	
4. Ext. conc. & int.	.4	0.0		1.0	0.0		.6	0.0		.7	0.0	
5. Silent attending	13.5	7.9		12.3	3.5		13.7	4.6		13.2	5.1	
Small Group Discussion												
6. Mod. discus. lead.	.02	0.0		0.0	0.0		.1	0.0		.03	0.0	
7. Lead. group discus.	.2	.2	122	.2	0.0	210	.2	0.0	344	.2	.1	
8. Tutoring	7.9	7.7	123	6.2	2.9	166	8.0	1.4	145**	7.4	3.7	1412**
9. Providing content	4.9	4.2	136	2.9	.8	191	1.9	0.0	304	2.9	1.4	
10. Silent attending	4.6	6.3		2.6	.2		1.8	0.0		2.7	1.8	
Large Group Discussion												
11. Lead. group discus.	.01	.6		.1	.7		.2	.8		.1	.7	
12. Tutoring	1.0	5.2		.5	10.7		[illegible]	11.5		.6	9.4	
13. Providing content	1.2	9.3	107	.4	20.5	76**	1.3	20.4	120**	1.0	17.3	994**
14. Silent attending	.4	6.6		.5	18.3		.6	13.8		.5	13.4	
Behavior Modification												
15. Positive message	3.0	1.7	87.5	1.8	.8	169.5	.8	.5	353	1.6	1.0	
16. Negative message	2.8	2.9	137.5	1.6	.8	128.5*	.6	.9	344	1.4	1.4	
Systems Management												
17. Man. comp. mat.	2.1	.1	38.5**	6.8	2.0	95**	8.1	2.8	160**	6.4	1.8	843.5**
18. Man. learn. mat.	13.7	10.2	93	18.9	9.0	122**	18.3	13.6	279.5**	17.5	11.1	1393.5**
19. Man. stud. act.	9.4	11.9		10.3	6.4		6.9	5.1		8.5	7.4	
20. Obs., list., walk.	10.0	12.6		11.3	16.1		11.1	14.8		10.9	14.7	
Other												
21. Act. unrel. to inst.	2.1	1.2		1.7	2.2		2.1	1.9		2.0	1.8	
Individual (1+2+3+4+5)	36.6	19.5		34.2	8.6		37.4	12.7		36.2	13.1	
Small Group (6+7+8+9+10)	17.6	18.3		11.9	3.9		12.0	1.4		13.2	7.0	
Large Group (11+12+13+14)	2.7	21.7	31.5**	1.4	50.2	21.5**	2.7	46.5	55**	2.3	40.8	308**
Behavior Modif. (15+16)	5.9	4.5		3.4	1.7		1.4	1.4		3.0	2.3	
Systems Management (17+18+19+20)	35.2	34.8		47.3	33.5		44.4	36.3		43.2	34.9	

*p < .05
**p < .01

Table 6

Teacher Observation Scale: Eastern Developmental Classrooms

Spring, 1970

Category	Teacher Observation Scale											
	Primary			Intermediate			Secondary			All Levels Combined		
	PLAN N=23	Control N=12	Mann Whitney	PLAN N=32	Control N=15	Mann Whitney	PLAN N=48	Control N=16	Mann Whitney	PLAN N=103	Control N=43	Mann Whitney
	Percent	Percent	U	Percent	Percent	U	Percent	Percent	U	Percent	Percent	U
Individual Instruction												
1. Diag. & didac. inq.	8.8	6.0	104.5	7.7	2.0	45**	7.1	1.1	62**	7.7	2.8	797**
2. Decision facilitat.	1.6	1.0	81 *	1.6	.4	170	2.6	.6	290	2.0	.6	1551.5**
3. Solution giving	12.7	5.2		12.5	4.3		14.6	1.9		13.5	3.7	
4. Ext. conc. & int.	2.9	.2		1.5	.1		1.9	.2		2.0	.1	
5. Silent attending	16.5	8.9		13.4	3.4		12.7	2.5		13.8	4.6	
Small Group Discussion												
6. Mod. discus. lead.	0.0	0.0		.03	.1		0.0	0.0		.01	.02	
7. Lead. group discus.	.3	2.3	84	.3	.4	231	.9	1.0	280	.6	.8	2191
8. Tutoring	3.8	5.3	115	3.2	.2	109**	2.7	1.3	242*	3.1	2.0	1598**
9. Providing content	4.9	1.1	102.5	2.3	0.0	202.5	3.8	0.0	272	3.6	.3	1688*
10. Silent attending	6.4	9.7		3.4	1.1		4.5	.9		4.6	3.4	
Large Group Discussion												
11. Lead. group discus.	0.0	.6		.2	2.1		.3	4.8		.2	2.7	
12. Tutoring	1.3	8.1		.2	12.3		.2	13.5		.4	11.6	
13. Providing content	.6	6.8	102	1.1	20.9	62.5**	3.7	26.5	125.5**	2.2	19.0	952**
14. Silent attending	.9	12.3		.5	16.6		1.1	15.8		.9	15.1	
Behavior Modification												
15. Positive message	1.7	1.1	96	.8	1.0	208	.4	.5	368.5	.8	.8	2155.5
16. Negative message	2.3	2.3	137	1.3	1.2	234.5	.5	.7	363.5	1.1	1.3	2020
Systems Management												
17. Man. comp. mat.	2.1	.5	71*	10.6	2.1	81.5**	10.2	6.8	260.5	8.5	3.4	1129.5**
18. Man. learn. mat.	14.8	9.0	83	15.6	10.6	166.5	13.8	9.3	263.5	14.6	9.7	1507.5**
19. Man. stud. act.	9.2	8.5		8.9	6.2		6.3	3.0		7.7	5.6	
20. Obs., list., walk.	7.5	9.9		12.6	13.8		9.6	8.3		10.1	10.7	
Other												
21. Act. unrel. to inst.	1.9	1.2		2.6	1.6		3.0	2.4		2.6	1.8	
Individual (1+2+3+4+5)	42.5	21.3		36.5	10.2		38.9	6.2		39.0	11.8	
Small Group (6+7+8+9+10)	15.4	18.3		9.3	1.7		12.0	2.2		11.9	6.5	
Large Group (11+12+13+14)	2.8	27.9	40**	2.0	51.8	2**	5.4	60.6	66.5**	3.7	48.4	369.5**
Behavior Modif. (15+16)	3.9	3.5		2.1	2.2		.9	1.2		1.9	2.2	
Systems Management (17+18+19+20)	33.5	28.0		47.6	32.5		39.9	27.4		40.9	29.4	

*p < .05
**p < .01

Table 7

Teacher Observation Scale: Eastern Developmental Classrooms

Difference Scores

Category	Teacher Observation Scale											
	Primary			Intermediate			Secondary			All Levels Combined		
	PLAN N=23	Control N=12	Mann Whitney	PLAN N=32	Control N=15	Mann Whitney	PLAN N=48	Control N=16	Mann Whitney	PLAN N=103	Control N=43	Mann Whitney
	Percent	Percent	U	Percent	Percent	U	Percent	Percent	U	Percent	Percent	U
Individual Instruction												
1. Diag. & didac. inq.	-2.01	1.16	106	-1.40	-.67	208.5	-2.26	-2.80	341	-1.94	-.95	2042.5
2. Decision facilitat.	-.05	-.01	124.5	-.97	.10	205.5	.54	.20	328	-.06	.10	2054.5
3. Solution giving	2.54	-.55		3.14	2.27		2.90	-1.92		2.89	-.07	
4. Ext. conc. & int.	2.50	.21		.50	.06		1.35	.16		1.34	.14	
5. Silent attending	2.98	.98		1.04	-.10		-.99	-2.08		.52	-.53	
Small Group Discussion												
6. Mod. discus. lead.	-.02	0.0		.02	.06		-.05	0.0		-.02	.02	
7. Lead. group discus.	.15	2.05	81*	.14	.37	223	.67	0.0	336	.39	.70	2042.5
8. Tutoring	-4.12	-2.36	117	-3.00	-2.78	220	-5.31	-.05	287.5	-4.33	-1.65	1931
9. Providing content	-.00	-3.10	111	-.57	-.75	233	1.92	0.0	328	.71	-1.12	1956
10. Silent attending	1.77	3.38		.81	.84		2.74	.86		1.92	1.56	
Large Group Discussion												
11. Lead. group discus.	-.00	.01		.13	1.41		.13	3.93		.10	1.96	
12. Tutoring	.29	2.96		-.26	1.67		-.38	2.06		-.19	2.17	
13. Providing content	-.66	-2.47	131	.73	.33	200	2.41	6.16	308	1.20	1.72	2151.5
14. Silent attending	.45	5.66		-.06	-1.76		.52	2.01		.32	1.71	
Behavior Modification												
15. Positive message	-1.36	-.52	109	-1.05	.16	107**	-.41	-.02	356	-.82	-.09	1646*
16. Negative message	-.54	-.50	135	-.27	.39	153.5*	-.15	-.18	379	-.27	-.07	2003.5
Systems Management												
17. Man. comp. mat.	-.01	.40	127	3.81	.08	218	2.12	4.00	317.5	2.16	1.63	2070.5
18. Man. learn. mat.	1.03	-1.18	119	-3.30	1.53	200	-4.47	-4.29	379.5	-2.88	-1.39	2094
19. Man. stud. act.	-.21	-3.37		-1.39	-.21		-.65	-2.10		-.78	-1.80	
20. Obs., list., walk.	-2.49	-2.69		1.21	-2.35		-1.43	-6.45		-.84	-3.97	
Other												
21. Act. unrel. to inst.	-.17	.02		.81	-.59		.87	.57		.62	.01	
Individual (1+2+3+4+5)	5.95	1.77		2.29	1.65		1.53	-6.46		2.75	-1.33	
Small Group (6+7+8+9+10)	-2.22	-.04		-2.60	-2.26		-.03	.81		-1.32	-.49	
Large Group (11+12+13+14)	.07	6.16	106.5	.54	1.65	232	2.68	14.16	316.5	1.43	7.56	1982
Behavior Modif. (15+16)	-1.91	-1.03		-1.33	.55		-.56	-.21		-1.10	-.17	
Systems Management (17+18+19+20)	-1.69	-6.85		.30	-.96		-4.45	-8.85		-2.36	-5.54	

*p < .05
**p < .01

Table 8

Teacher Observation Scale: Western Developmental Classrooms

Difference Scores

Category	Teacher Observation Scale											
	Primary			Intermediate			Secondary			All Levels Combined		
	PLAN N=35	Control N=14	Mann Whitney	PLAN N=39	Control N=14	Mann Whitney	PLA N=14	Control N=5	Mann Whitney	PLAN N=88	Control N=33	Mann Whitney
	Percent	Percent	U	Percent	Percent	U	Percent	Percent	U	Percent	Percent	U
vidual Instruction												
Diag. & didac. inq.	9.89	.68	68.5**	4.91	2.15	218	1.04	-.69	31	6.27	1.09	880.5**
Decision facilitat.	.08	0.0	231	.67	-.30	185	.17	0.0	25	.36	-.12	1312
Solution giving	-.37	.37		.63	1.47		-2.25	3.59		-.23	1.32	
Ext. conc. & int.	-.10	.03		-.16	.07		-.72	.03		-.23	.05	
Silent attending	-1.61	-.64		-3.04	-1.55		-.94	-.47		-2.14	-1.00	
l Group Discussion												
Mod. discus. lead.	-.35	.02		-.02	-.01		0.0	0.0		-.15	.01	
Lead. group discus.	-.94	-2.15	213	-1.55	-.52	217.5	-.97	-.14	29.5	-1.21	-1.15	1420.5
Tutoring	-.27	-1.79		-1.86	-3.52	268	1.13	.31	30.5	-.75	-2.20	1354.5
Providing content	-.05	2.08	180.5	.49	.71	234.5	1.23	0.0	27.5	.39	1.18	1382.5
Silent attending	.19	-2.86		-2.22	-2.35		-.37	.00		-.97	-2.21	
e Group Discussion												
Lead. group discus.	-.48	-6.73		-.06	-3.55		-.17	-7.27		-.24	-5.46	
Tutoring	-.79	2.67		1.17	-4.03		.00	4.84		.21	.16	
Providing content	-.26	8.22	130.5	-.26	1.30	249.5	.03	3.17	27	-.22	4.52	1066.5*
Silent attending	-.65	3.58		.39	-1.25		.05	-.19		-.08	.96	
vior Modification												
Positive message	.33	-.19	146*	.29	-.18	181	-.05	.05	26	.26	-.14	988**
Negative message	-1.04	-.62	193.5	-.85	-.73	252	-.49	-.13	26	-.86	-.59	1231
ems Management												
Man. comp. mat.	.23	.13	233.5	-.89	2.23	127**	1.23	.61	34.5	-.10	1.09	1114.5*
Man. learn. mat.	-3.03	-.10	171	.03	2.23	240	3.71	-.42	26	-.60	.83	1304
Man. stud. act.	-4.59	-5.01		-.80	1.21		-5.62	-.52		-3.08	-1.69	
Obs., list., walk.	3.07	2.41		2.47	3.83		.97	-2.09		2.47	2.33	
er												
Act. unrel. to inst.	.74	-.13		.63	2.81		2.02	-.81		.90	1.02	
vidual (1+2+3+4+5)	7.88	.45		3.01	1.84		-2.69	2.44		4.04	1.34	
l Group (6+7+8+9+10)	-1.42	-4.69		-5.15	-5.70		1.01	.17		-2.69	-4.39	
ge Group (11+12+13+14)	-2.18	7.75	225	1.24	-7.53	130**	-.09	.69	30	-.33	.20	1141
vior Modif. (15+16)	-.71	-.80		-.55	-.92		-.54	-.08		-.61	-.74	
ems Management (17+18+19+20)	-4.33	-2.58		.82	9.50		.30	-2.41		-1.31	2.57	

*p < .05
**p < .01

Hypothesis 1

The first hypothesis relates to data reported in Tables 3-6. As hypothesized, PLAN teachers at the primary, intermediate, and secondary levels and all levels combined spent more time than Control teachers during both fall and spring in diagnostic and didactic inquiry (category 1) and decision facilitating during individual instruction (category 2). This difference was significant at the intermediate level in the fall western classrooms.

At the secondary level for category 7 (leading small group discussion) for both east and west, fall and spring, the PLAN percentage was larger. The difference was significant at the primary level in the spring in the west and in the east.. The PLAN percentage was also larger for the intermediate level in all cases except spring west and all levels combined for fall west.

In category 8 (tutoring with small groups) in the east and west, fall and spring, PLAN classrooms were greater than Control at all levels except primary for fall west and east spring. The difference was significant at the intermediate level for fall west and for all levels combined for fall west and spring east.

Hypothesis 1 is only partially supported in categories 1, 2, 7, and 8.

Hypothesis 2

In category 9 (providing content to small groups) Control percentages were greater only for the intermediate level in the fall west and the primary level for spring west.

In category 13 (providing content in large group) in all cases, the Control group was greater than PLAN.

In category 16 (negative message) at all levels and all levels combined for both the east and west, PLAN was greater than Control in the fall and Control greater than PLAN in the spring. The one exception was eastern secondary where Control was greater than PLAN in the fall. The difference was significant at the primary level for eastern spring.

In all cases for category 17 (managing records) and in all cases except intermediate level for spring west in category 18 (managing learning materials) percentages were greater for PLAN than Control.

For categories (11 + 12 + 13 + 14) Control was greater than PLAN at all levels and all levels combined for east and west, both spring and fall.

Hypothesis 2 was supported in categories 12, 13 and (11 + 12 + 13 + 14) and partially supported in category 16.

Differences Between Fall and Spring TOS Data Eastern Developmental Classrooms

The differences in categories on the TOS between fall and spring for the east is reported in Table 7. There was an increase in category 1 (diagnostic and didactic inquiry) at the secondary level for PLAN classes, in category 2 (decision facilitating) at the primary level for PLAN classes, in category 7 (leading group discussion) for the PLAN secondary classrooms, and in category 8 (tutoring) for PLAN intermediate classrooms. The differences were significant for category 2 at the primary level, and category 8 at the intermediate level.

For Hypothesis 2 the percentage was greater in eastern Control classrooms for the intermediate level in category 9 (presenting content in small groups), for primary and intermediate levels in category 13 (presenting content in large groups), for intermediate and all levels combined in category 16 (giving negative verbal or non-verbal messages, for primary and secondary levels in category 17 (managing records), and for all levels except primary in category 18 (managing learning materials). The differences were significant for primary and intermediate levels in category 13.

Differences Between Fall and Spring TOS Data Western Developmental Classrooms

The differences in categories on the TOS between fall and spring for the west are reported in Table 8. For Hypothesis 1 in category 7 (leading small group discussions) PLAN was greater than Control at primary and secondary levels. The difference was significant for the secondary level. In diagnostic and didactic inquiry (category 1) and in small group tutoring (category 8) PLAN was greater than Control at all levels and all levels combined. In category 15 (positive messages) PLAN was greater than Control at all levels and all levels combined except secondary.

For Hypothesis 2 there were no significant differences in any of the categories. The percent was greater in Control at all levels and all levels combined for categories 13 (providing content to large group), 16 (negative messages) and at the primary and intermediate levels and all levels combined for category 18 (managing learning materials).

Discussion

The training of PLAN teachers is defined by the conference objectives and the corresponding classroom performance criteria. Therefore, the greatest changes in teacher behavior could be expected in the spring following training as opposed to the fall. In the spring the teachers would have worked with the consultant on the performance criteria. The data reported in this study provide the first opportunity to observe behavior change in the same group of teachers over a one year period. The teachers observed in this report attended spring and summer training and had one year or more of in-service help from consultants in the west and one-half year or more of consultant help in the east.

The categories most consistently in support of the hypotheses are 1 (diagnostic and didactic inquiry), 2 (decision facilitating), and 8 (tutoring in small groups). At all levels in both east and west the percent of teacher behavior in PLAN classrooms in these categories was greater than in the Control classrooms. The exception was in the primary fall west and primary spring east. In the west the increase from fall to spring was consistently in favor of PLAN at all levels and all levels combined in category 1 (diagnostic and didactic inquiry) and category 8 (small group tutoring). The increase in favor of Control in the west in fall and spring comparisons in category 18 (managing learning material) would support a shift in teacher activities from the management function in the fall to tutoring and individual counseling in the spring (categories 1 and 2). The fact that category 17 (managing computer materials and records) did not reflect the same change could be anticipated since Control classes did not use computers as a method of record keeping.

The fall-spring comparisons in these categories are seen as highly supportive of the model of a teacher's role in the PLAN teacher training program.

Positive support of student behavior is greatly emphasized in the written materials. During the fall and winter in-service training, consultants modeled positive support of student behavior for teachers and selectively supported the use of positive responses and ignored the use of negative responses teachers made to student success. The improvement in teacher response is evident in the decrease in category 16 (giving negative verbal or nonverbal messages) for PLAN teachers from fall to spring. Equally desirable was the increase in the use of positive responses (category 15) at all levels except secondary in fall-spring comparisons in the west. The lack of difference between fall and spring in the east and the shift in emphasis in the west could suggest the influence of a consultant periodically supporting the teacher's classroom use of positive reinforcement throughout the school year.

By spring PLAN teachers were still spending more time than Control teachers in managing learning materials (category 18). It was expected that by spring students in PLAN classes would be assuming more responsibility for these activities. The wider and more frequent use of a variety of materials in PLAN could influence the data in this category. The fall-spring comparisons in all but primary east and secondary west indicate a greater percentage for Control, however. This comparison could suggest a trend in the right direction.

The differences in PLAN and Control in large group instruction at all levels, providing content, and the use of negative reinforcement is encouraging.

The teacher role in all of the categories for Hypothesis 1 is individualized according to the needs of the students. For this reason an increase over time in the amount of time spent in diagnostic inquiry, decision facilitation, small group discussion, or tutoring does not describe the extent of individualization. The quality of that individualization-the extent to which the teacher individualizes these activities-is not intended to be assessed with a scale such as the TOS. All of the desired teacher behavioral changes will finally be validated by the desirable changes in student behaviors as measured by the PLAN SOS and the student's achievement of his individual Program of Studies.

APPENDIX I

OPERATIONAL DEFINITIONS

OF TEACHER BEHAVIOR CATEGORIES

Revised March, 1970

Operational Definitions of Teacher Behavior Categories

Teacher behaviors are conceptualized as representing six major behavioral categories. The following is a list of the six major teacher behavior categories and their associated subcategories in their August, 1969, revised form.

	Category
I. Individual Instruction	
1. Diagnostic and didactic inquiry	(1)
2. Decision facilitating	(2)
3. Solution giving	(3)
4. Extending concepts and interests	(4)
5. Silent attending	(5)
II. Small Group Interaction	
1. Modeling the discussion leader role	(6)
2. Leading group discussion	(7)
3. Tutoring (discussion)	(8)
4. Providing content (lecturing)	(9)
5. Silent attending	(10)
III. Large Group Interaction	
1. Leading group discussion	(11)
2. Tutoring (discussion)	(12)
3. Providing content (lecturing)	(13)
4. Silent attending	(14)
IV. Behavior Modification	
1. Giving positive verbal or non-verbal message	(15)

2. Giving negative verbal or non-verbal message (16)

V. Systems Management

1. Managing computer materials and records (17)

2. Managing learning materials and equipment (18)

3. Managing student activities (19)

4. Observing, listening, or walking (20)

VI. Other

1. Activities unrelated to instruction (21)

These 21 categories are to be viewed as being mutually exclusive and exhaustive. That is, any teacher behavior observed in a classroom at any one time is to fit one and only one of the categories. The task of the person who observes and categorizes teacher behaviors is to make two rapid judgements about each behavior. The first is to decide in which major category the behavior belongs, and the second is to select the appropriate subcategory. In order to make the observer's task as automatic as possible and to facilitate observer reliability, the major categories and their subcategories are described rather extensively.

I. Individual Instruction. This major category refers to a teacher's interaction with one student for the purpose of resolving a problem or extending concepts and interests. The opportunity for individual instruction usually arises out of the teacher's recognition of an opportunity to extend concepts and interests. A teacher might question a student in order to determine the degree to which he has achieved a Teaching-Learning-Unit (TLU) objective (See Appendix A for examples of TLU's); he might ask the student to give examples that illustrate the objective, to explain the objective in his own words, or simply to tell what he learned. A teacher might then want to help the student relate the concept to other times or other societies. Individual instruction, then, is designed to help individual students to advance intellectually beyond their present level of develment.

II. Small Group Interaction. This major category refers to a teacher's interaction with a group of at least two students but not more than one-half the class. One function of the teacher in small group interaction is to model the small group discussion leader role. His job is to teach students how to lead a group discussion so that eventually students can carry on an effective small group discussion without the teacher's presence. A model of the discussion leader role must explain to the group the leader's and participants' roles and responsibilities. The model will tell the group members that he is then going to demonstrate the small group leader role and he will urge the group members to watch carefully what he does. Another function of the teacher is to actually lead the discussion, to define the topic and state the criteria for evaluating discussion, to direct the discussion by pointing out unsubstantiated statements, to call on non-participants, to limit over-participation, asking for clarification of statements, and then to summarize at the close of the discussion. In a group discussion the teacher may also function as a tutor of the group or he may even lecture.

III. Large Group Interaction. This major category refers to a teacher's interaction with a group of more than one-half the class up to as large a group as the whole class. All but one of the behaviors in small group discussion may also occur in large group discussion. That exception is modeling the small group discussion leader role, which, by definition, is relevant only to small groups. All other teacher behaviors in large group interaction are the same as those that might occur with a small group. They include leading discussion, tutoring, lecturing, or simply attending to the students.

IV. Behavior Modification. This major category occurs when the teacher communicates to a student a positive or negative verbal or non-verbal message for the purpose of increasing or decreasing the probability that the student's behav-

ior will occur again. A teacher may emit behavior modification messages at any time he is functioning as a tutor, or systems manager or interacting in a group. One function of a small group discussion leader, for example, is to reinforce students for participating and for approximating evaluative criteria. Functioning as a systems manager, a teacher may emit a negative message to a student who is annoying another student. As a tutor the teacher may reinforce a correct answer given by the student.

V. Systems Management. This major category consists of those teacher behaviors that regulate the flow of information and learning tools in order to facilitate each student's learning activities. It concerns classroom logistics in that it functions to keep students progressing from one activity to the next. Systems management is distinguished from tutoring in that management regulates classroom activities in order to create a functional learning environment. A teacher, for example, may ask a student what TLU he is working on so that the teacher can bring his record up to date. This is a systems management function. The teacher may later, however, use this information from his records in a tutoring session with the student.

VI. Other. This major category is a catch-all for behaviors unrelated to PLAN instruction. It includes small talk, doing nothing, or doing personal chores such as putting on a sweater.

Operational Definitions and Examples of the Subcategories of Teacher Behaviors

Category 1. Diagnostic and didactic inquiry. This subcategory of individual instruction is represented by the teacher's attempts to clarify and probe into the source of problem areas. It is called both diagnostic and didactic because of the gray area between questioning to help the teacher understand the student and questioning which helps the student understand himself better. Diagnostic and

didactic inquiry cannot take place during a brief exchange of a few words. If the teacher, for example, asks only one question such as, "Are you done?" diagnostic and didactic inquiry has not taken place. In this case the teacher is managing student activities by checking progress (Category 19). For diagnostic and didactic inquiry to occur, the inquiry would need to be followed up by identifying a learning problem and developing the problem toward some solution. Questions or statements that would probably be placed in this category might include:

"What did you do to review for the test?"

"What are they asking for in this problem?"

In a chemistry class the teacher asks, "What do you think will happen if you do it this way?"

"Tell me in your own words what that objective means."

"Why were you able to complete only two steps of your TLU?"

"After you divide by 2, what should you do?"

"Did you miss those objectives on the test because the learning activities were too difficult?"

Category 2. Decision facilitating. This subcategory of individual instruction refers to those behaviors of the teacher that invite participation of the student in the process of making decisions about future actions. There are two aspects to this category. One is that it concerns planning for future activities. The second is that the student is given the opportunity to make his own decision and to contribute to the planning. When a teacher prescribes an activity for a student and follows the prescription with a rhetorical, "okay?", this is not decision facilitating; it is solution giving. Decision facilitating occurs in individual instruction whenever the teacher encourages the student to contribute to the planning and decision making process before a course of action is finalized. Decision facilitating may or may not occur while the teacher and student

are discussing a student's Program of Studies (POS) (See appendix B for an example of a POS.) and it may occur at other times as well. Since discussion of a POS concerns future planning this is a likely opportunity for the teacher to facilitate the student's own decisions about the organization of his time and managing his own behavior. It might be represented by such questions or statements as:

> "What do you think you should do to prepare yourself better for the next module?"
>
> "After you work on your social studies TLU for one-half hour, would you like to do a science experiment as a reinforcing activity?"
>
> "You're saying then that you prefer to work alone on social studies, but would like some help on your math?"
>
> "How many steps should we schedule you to complete each day in your social studies?"
>
> "After you complete two steps in your math TLU, what would you like to do as a reinforcement activity?"

Category 3. Solution giving. Teacher behaviors in this subcategory of individual instruction consist of the course of action for a student to take or direct explanation that resolves the student's problem. Solution giving during individual instruction is distinguished from managing student activities by the context and length of interaction. If, on one hand, the student-teacher interaction consists of only one exchange regarding a process problem (e.g., the student asks for a certain book and the teacher tells him where to find it), then the teacher is managing student activities. A teacher's behavior, on the other hand, is considered to be solution giving if the interaction lasts long enough to develop the process problem and to work out a solution or if the problem concerns TLU content. The teacher is solution giving, for example, when he works out a math problem for a student or when, during the course of individual instruction, he tells the student where to find the answer to a problem.

Examples that might be categorized as solution giving include:

> "Chartres is in France, not Belgium."
>
> "You'd better work on that objective a little longer before you take the test."
>
> "When you get to the second step, you'll have to go to the next room for the materials."
>
> "What you need to do now is work out some learning strategies for yourself."
>
> "An isosceles triangle has two sides of the same length."
>
> The teacher corrects a student's work while the student looks on.

Category 4. Extending concepts and interests. This subcategory occurs when the teacher takes an opportunity during individual instruction to relate the student's current learning activities to other areas of the student's knowledge and experience and to encourage further work in the area. Some ways to extend concepts and interests are:

> The teacher's giving examples of his own experiences which illustrate the concept or referring to the student's experiences which illustrate the concept.
>
> The teacher's asking the student to describe a situation from another time or in another situation in this time outside the student's immediate experience but which is familiar and illustrates the concept.
>
> The teacher's asking the student a question requiring a complex answer or a value judgment. An example of the former is, "What facts do you have to support this idea?" An example of the latter is, "How would changing your values change what you do in your daily life?"
>
> The teacher's asking a student to make hypotheses or predictions as to cause or results of an action. An example might be, "What circumstances (unforeseen by you now) could effect the results differently than you predicted?"
>
> The teacher's encouraging a student's interest in a concept by posing questions, suggesting time to pursue an interesting aspect of a topic, making resources available, and helping the student plan further study.

These teacher behaviors in individual instruction go beyond the student's POS and beyond the individual learning activities required in a TLU.

Category 5. Silent attending in individual instruction. This subcategory consists of the teacher's non-talking behavior during individual instruction. It might include, for example:

Pausing while a student thinks through his answer.

Listening to a student's response to the teacher's question.

Observing a student work a problem.

Category 7. Leading small group discussion. The discussion leader's role is to direct discussion and not to participate in the discussion. His role is first to state the topic of the discussion and then to review the criteria for evaluating participation in discussion. The discussion leader might state, for example, that participants' arguments will be evaluated by the evidence they can present in support of their points of view. During discussion, the leader directs the participation of discussants so there is an equal opportunity for all students to participate. Also during discussion he points out any unsubstantiated statements and asks for clarification of confusing or inadequately stated points. At the end of the discussion the discussion leader summarizes the major points. Group discussion leader behaviors that might be put in this category include:

Reminding participants that opinions are to be supported by facts.

Asking one of the silent students what his opinion is.

Asking a student to give an example to illustrate his point.

Category 8. Small group tutoring (discussion). This subcategory of small group interaction refers to a teacher's conducting a group tutoring session in which problems are identified and resolved through a question and answer procedure. Tutoring a group occurs when the teacher is interacting with two or more students. If a teacher is leading a group discussion and deviates from his leader role to participate as a discussant, his discussant behavior is to be categorized as group tutoring. Tutoring is distinguished from lecturing (category 9) in that tutoring involves active participation by students whereas lecturing requires only

quiet listening on the part of the group members. Teacher behaviors that might be categorized as tutoring (discussion) include:

Extending concepts through a group discussion.

Asking for a student volunteer to describe in his own words the TLU objective being discussed.

Asking a group that is discussing learning strategies to list possible reinforcing activities.

Asking a group that is discussing a new TLU if everyone understands all the learning activities that are listed in the TLU.

Category 9. Providing content (lecturing) in a small group. This subcategory of group discussion refers to the teacher's holding the floor for an extended period of time. The distinctions between providing content (lecturing) and discussion (category 8) regard content and length of time of teacher talk. If the teacher solicits student participation by asking questions, then, of course, the category is discussion (category 8). The teacher may, however, interject into the discussion an extended explanation or other information. If the latter takes longer than about 60 seconds, it should be thereafter categorized as lecturing. Later, the 12 preceding recorded numbers must be changed from 8 to 9. (Note: This is the only occasion where any categorization number is changed on the basis of succeeding teacher behavior.) Examples of teacher behaviors during group discussion that might be categorized as lecturing include:

Showing students how to work a long division problem.

Describing the plot of a story.

Relating the details of Paul Revere's ride.

Category 10. Silent attending in a small group. This subcategory consists of the teacher's non-talking behavior during small group discussion. It might include, for example:

Waiting for a student to volunteer a comment.

Pausing after calling on a non-participant.

Listening to one student challenge another.

Category 11. Leading large group discussion. This subcategory of Large Group Interaction refers to interaction in a group of more than one-half the students in the class in which the teacher functions as a discussion leader. The teacher roles in this category are exactly the same as in category 7.

Category 12. Large group tutoring (discussion). See category 8 for specification of teacher behaviors.

Category 13. Providing content (lecturing) in a large group. See category 9 for specification of teacher behaviors.

Category 14. Silent attending in a large group. See category 10 for specification of teacher behaviors.

Category 15. Giving positive verbal or non-verbal message. This subcategory refers to teacher approval of desirable behavior. It consists of praise and gesture of approval to a student who is behaving in a desirable way. Some behaviors that might be categorized as positive verbal or non-verbal messages are:

"I'm so pleased that you found that book without asking my help."

"It's good to see you studying so much today."

Patting a student on the shoulder when he is doing a TLU activity.

Category 16. Giving negative verbal or non-verbal message. This subcategory refers to teacher disapproval of undesirable behavior. Disapproval need not be charged with anger; it need only communicate that the student's behavior is unacceptable and must be curtailed. Negative messages are distinguished from "managing student activities" by the context of the message. The statement, "Go to your seat," for example, is a negative message if the context is that the student has broken an explicit or implicit rule; it is a management behavior (category 19), however, if the teacher is rearranging the distribution of students to facilitate ongoing activities. Examples of negative message might include:

Verbally criticizing some students for scuffling.

Staring and scowling at students who are joking and laughing.

Telling a student who is being a nuisance to get back to his seat.

Category 17. Managing records and computer materials. This management function includes the teacher's working on computer cards and or a print-out. (See appendix C for examples of a computer print-out.) It also includes resolving student problems with the mechanical and procedural aspects of the use of computer materials. Maintaining the teacher's own records often involves the organization of print-out information and transferring data from a print-out to a record book. This category, then, includes all activities of the teacher that are involved in the processing of computer materials and keeping up teacher's records of students' PLAN activities. It does not include taking attendance, collecting lunch money, and so forth; these activities belong in category 21. Teacher interaction with a student regarding computer materials may develop into a tutoring session provided the teacher and student take time to clarify and resolve a student learning problem. A teacher might, for example, tell a student to erase careless marks on his text card (managing computer materials). If the teacher and student go on to identify the source of the problem as being perhaps that the student started his test too late in the day and had to hurry through it, then management has evolved into individual instruction. For the Control (non-PLAN) teacher, any activities involving records of student performance belong in this category. Examples of behaviors in category 17 include:

Checking test cards for marking errors.

Distributing or collecting computer cards.

Posting a print-out.

Asking a student what TLU he is working on so that the teacher can mark this in his record book.

Reading a print-out.

Transferring information from a print-out to the teacher's records.

Category 18. Managing learning materials and equipment. Teacher behaviors

in this management subcategory include distributing TLU's, tests, materials, and equipment, as well as repairing equipment, and so forth. It also includes brief interactions with students that require the teacher to find certain materials or to answer logistics problems about materials. If a teacher in response to a student's request goes to the bookshelf and obtains a book for the student, the teacher's behavior is categorized as managing learning materials and equipment. If, on the other hand, the teacher said to the student, "Go to the bookshelf and get the book," then the teacher is managing student activities (category 19). The teacher may, in discussing with the student the organization of books on the shelf, show him how to systematically look for a book; in this case the teacher's behavior belongs in category 3. Behaviors that might be categorized as managing learning materials and equipment include:

Assembling materials for a science experiment.

Mending a broken audio tape.

Placing new TLU's in the file.

Distributing module tests.

Specifying the location of instructional materials upon request of a student.

Filing tests.

Category 19. Managing student activities. This management subcategory concerns brief interactions with students in which the teacher directs students to do something. The directives usually concern the distribution and placement of students throughout the classroom, i.e., the movement of students from one place to another. This category may also include, however, such directives as calling for the attention of students at the beginning of class or telling a student to wait a little while before he does something. Managing student activities may also consist of a teacher's response of "yes" or "no" to a student's request to do something. If the directive focuses on the management of learning materials or computer materials, then management categories 17 or 18 may be more

appropriate. In general, however, if the student's behavior is contingent upon permission or directive from the teacher, then the teacher is managing student activities. Examples of this management category include:

"All right, children, get your TLU's and start to work."

"Some of you in the back of the room, go over to the language arts center to work."

Telling the last two students waiting in line to see the teacher to go back to their seats.

Telling a student that he (the teacher) is now ready to listen to the student's problem.

Category 20. Observing, listening, or walking. This management subcategory refers to a teacher's monitoring student activity, by such behaviors as:

Walking around the classroom observing students at work.

Listening to a student's question (but different from category 5, 10 or 14).

Sitting at the teacher's desk and looking over the class.

Watching a student tutor another student.

Category 21. Activities unrelated to instruction. Teacher behaviors belong in this subcategory if they cannot properly be placed in any of the other categories. These behaviors include silence or confusion that sometimes occurs (e.g., just before recess or the end of the period). Socializing by the teacher (e.g., telling a girl how nice her hair looks) belongs in this category. Activities required for the management of the school in general, such as selling tickets to a school program, also would be categorized in this group. Other examples include:

Asking a student if his mother is still in the hospital.

Waiting the last few seconds before the dismissal bell.

Looking through her purse for a handkerchief.

Taking role at the beginning of the period.

Calling out names of students who are to go for their music lesson.

Collecting lunch money.

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